

**Occupational Noise and Workplace Acoustics:
Advances in Measurement and Assessment Techniques**
Dariusz Pleban, Editor
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1 PURPOSE

The preface states that the purpose of this book “offers the readers the opportunity to make themselves acquainted with the subject matter of selected up-to-date techniques and methods in the areas of noise control and improvement of acoustic comfort.” This is an accurate statement of what the book does. It is not, as one might expect, from the title about occupational noise exposure. It is focused on the acoustic comfort of workers in office or light industrial environments.

2 SUMMARY

This book was a surprise. From the title, the subject was anticipated to be occupational noise exposure. This is clearly not the case as noted above; it is about acoustic comfort in the workplace. The treatment is to provide a description of the techniques for measurement and assessment of various workplace environments at a high level. The authors do not get into the theory, or the details of the measurement and data analysis involved with the methods described. In many ways, the chapters, each by a different author, are like one or more conference papers with extended introductions. There are numerous references provided, and these would be helpful to the reader who wants to know more.

This is a good book to get a quick overview of the standards, indices, and basic analysis techniques used in various occupational environments. The coverage includes offices, small scale product lines, and classrooms. However, this is only an introduction to the topics; for detailed treatments, the reader will have to go elsewhere.

In the end, this reviewer felt that there was too little detail provided in this text. The treatment of each topic did not go far enough to provide a good foundation for further investigation. These chapters serve as a starting point, but the reader is left wanting much more. Fortunately, there are extensive references cited which one can go to.

3 DISCUSSION

3.1 Chapter 1. Basic Concepts and Quantities Characterizing Sound — *Dariusz Pleban*

This chapter provides a low-level introduction to sound and acoustics. The range of topics covers many of the basics from the definition of frequency to reverberation time. In

only 10 pages, there is not room for much detail or explanation beyond basic definitions.

3.2 Chapter 2. Sound Field Visualization in Noise Hazard Control — *Grzegorz Szczepański*

This chapter focuses on the visualization of sound fields. The focus is on beamforming and acoustic holography. The introduction provides an overview and history of the work done in these areas. There are several examples of measurements and studies presented in this chapter. Unfortunately, all the figures are shades of gray, limiting the ability to be helpful for the reader to understand the sound field variations being described.

This chapter serves as an introduction to methods of visualization, but it does not provide instructions for usage or detailed insight in terms of interpreting such results. For those unfamiliar with these techniques, it may be helpful, but further study would be required to use such techniques.

3.3 Chapter 3. The Surround Sound in Aural Perception Tests — *Grzegorz Szczepański*

Much of this chapter is devoted to describing how to set up and run aural perception tests. A perception test with multiple scenarios is described.

3.4 Chapter 4. Wireless Sensor Networks — *Leszek Morzyński*

From concept to hardware implementation of a wireless network of acoustic sensors is described in this chapter. The connection to occupational noise is described in terms of the use of wireless networks to monitor the sound environment to which workers are exposed.

3.5 Chapter 5. Genetic Optimization Techniques in Reduction of Noise Hazards — *Leszek Morzyński*

The foundations of genetic optimization are treated in some detail in this segment. The implementation of this optimization technique is also well described with computer programs and examples. This is more of a discussion of how to do genetic optimization than a discussion of the application to noise issues.

3.6 Chapter 6. A Multi-index Method for Acoustic Quality Assessment of Classrooms — *Jan Radosz*

The numerous indices and quality indicators for room acoustics and more particularly classroom acoustics are discussed in this chapter. Most of the segment is devoted

to describing these. At the end of the chapter, an example study of nine classrooms is presented.

3.7 Chapter 7. Studies on Acoustic Properties of Open-Plan Office Rooms — *Witold Mikulski*

Once again, the indices to quantify speech difficulties are discussed along with international standards related to open plan office acoustic characteristics. Several small examples are presented along with computer simulations of office place acoustics. While the text does not describe the details of the computer models, this was one of the more thorough chapters.

3.8 Chapter 8. Ultrasonic Noise Measurements in the Work Environment — *Jan Radosz*

Much of the material in this chapter is devoted to measurement uncertainty and means to minimize estimation errors. A good way to characterize this chapter is as a discussion of ultrasonic measurement techniques and error

considerations. There is also background material on ultrasonic hazards for workers.

3.9 Chapter 9. Studies on Sound Insulation of Enclosures in the 10 to 40 kHz Frequency Range — *Witold Mikulski*

The focus of this segment is the performance of enclosures in the range from 10 kHz to 40 KHz.

3.10 Chapter 10. Studies on Sound Insulation Effectiveness of Phononic Crystals — *Jan Radosz*

This chapter is devoted to the effects of regularly spaced scatters for sound insulation. This short discussion is more of an introduction than a thorough treatment.

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